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STATE OF NORTH BORNEO

ANNUAL REPORT

ON THE

MEDICAL DEPARTMENT

FOR THE YEAR

1936.

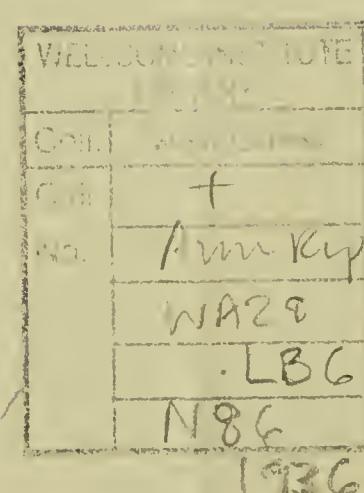
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STATE OF NORTH BORNEO

ANNUAL REPORT ON THE MEDICAL DEPARTMENT FOR THE YEAR, 1936.

I.—VITAL STATISTICS.

1. *Population.*—The estimated population of North Borneo on the 31st December, 1935, was 284,813. The number of live births registered during the year was 8,106 and the number of deaths 6,282. The excess of immigration over emigration during the year amounted to 3,889. The estimated population of the State on 31st December, 1936, was therefore 290,526, an increase of 5,713 on the figure for 1935.

BIRTHS.

2. 8,184 births were registered during the year, compared with 10,211 during the previous year. This decrease is due to the fact that over 3,000 births were registered during 1935 of children whose births had actually occurred before that year and had not been previously registered. The birth rate for the year was 28.2 per mille compared with ~~25.2~~ ^{35.8} per mille in 1935. Of the total births 4,274 were males and 3,910 females, giving a birth sex ratio of males to females of 109 : 100.

Summary of Births according to Race and Sex.

	Male.	Female.	Total.
European	3	—	3
Natives of the State	3,233	2,985	6,218
Chinese	912	806	1,718
Malays and Javanese	64	66	130
Others	62	53	115
	4,274	3,910	8,184

DEATHS.

3. 6,282 deaths were registered during the year, an increase of 467 or 9.2 per cent. on the total of 5,815 for 1935. This increase was due to an epidemic of influenza and dysentery in the Kota Belud district. The death rate for the year was ~~21.6~~ ^{21.6} per mille compared with 20.3 per mille for the previous year.

Table showing death rate per mille for the last five years.

Year.	Rate per mille.	Year.	Rate per mille.
1932	19.2	1935	20.3
1933	20.4	1936	21.6
1934	25.0		

Summary of Deaths according to Race and Sex.

	Male.	Female.	Total.
European	—	—	—
Natives of the State	2,813	2,302	5,115
Chinese	572	338	910
Malays and Javanese	132	58	190
Others	47	20	67
	3,564	2,718	6,282

The sex ratio for deaths was 131 males: 100 females.

INFANT MORTALITY.

4. 1,431 deaths or 22.7 per cent. of the total mortality occurred during the first year of life, compared with 1,287 deaths and 22.6 per cent. in 1935. The infantile mortality calculated on the number of live births recorded during the year was 176.5 per mille compared with 182.1 per mille in 1935 and 231.8 per mille in 1934.

Summary of Infantile Mortality according to Races for the year 1936.

Race.		Live Births.	Infant Deaths.	Mortality per mille.
European	...	3	—	—
Natives of the State	...	6,166	1,080	175
Chinese	...	1,700	290	170
Malays and Javanese	...	127	43	338
Others	...	110	18	164
Total	...	8,106	1,431	176

The following table gives for comparison the Infant Mortality in the Federated Malay States for 1934:

Malays	...	181 per mille
Chinese	...	151 per mille
Others	...	81 per mille.

5. The following table gives a summary of the principal causes of deaths of infants (under one year of age) in Sandakan during the year under review, the number of deaths given under 'Other causes' represents cases in which no qualified medical attention was sought by the parents:

	Deaths.
Malaria definitely diagnosed	2
Fever unspecified	20
Tetanus	1
Beri-beri	8
Bronchitis	3
Pneumonia (all forms)	14
Other diseases of the respiratory system	19
Diarrhoea and enteritis	30
Other diseases of the digestive system	1
Convulsions	6
Other causes	59
Total	163

6. Classification of Births in North Borneo, 1936.

District.	Total.	Europeans		Natives		Chinese		Malays		Others	
		Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
Bundu Tuhan	230	—	—	126	104	—	—	—	—	—	—
Ranau	466	—	—	267	196	1	2	—	—	—	—
Tambunan	350	—	—	165	183	1	1	—	—	—	—
Keningau	254	—	—	121	116	7	9	1	—	—	—
Sepulot	26	—	—	10	16	—	—	—	—	—	—
Pensiangan	95	—	—	42	53	—	—	—	—	—	—
Tenom	216	—	—	78	70	34	27	2	2	3	—
Sipitang	168	—	—	77	72	11	6	1	—	—	1
Mempakul	364	—	—	187	157	14	3	2	1	—	—
Beaufort	419	—	—	156	156	43	36	14	6	3	5
Papar	681	—	—	249	223	92	83	10	12	6	6
Penampang	316	—	—	147	133	16	13	2	2	3	—
Jesselton	286	1	—	25	23	107	94	2	9	17	8
Mengattal	97	—	—	33	47	12	4	—	—	—	1
Tuaran	444	—	—	215	189	20	15	1	3	1	—
Kota Belud	654	—	—	333	304	6	11	—	—	—	—
Kudat	353	—	—	100	83	94	72	1	3	—	—
Langkon	479	—	—	225	242	6	3	—	3	—	—
Labuk & Sugut	474	—	—	234	221	9	6	1	—	1	2
Kinabatangan	231	—	—	113	108	5	1	2	1	1	—
Sandakan	723	2	—	45	52	297	289	6	11	9	12
Tambisan	31	—	—	16	14	—	—	1	—	—	—
Tungku	64	—	—	31	25	3	4	1	—	—	—
Lahad Datu	108	—	—	36	36	15	10	4	4	1	2
Semporna	269	—	—	140	102	11	8	2	2	3	1
Tawau	386	—	—	62	60	108	109	11	7	14	15
	8,184	3	—	3,233	2,985	912	806	64	66	62	53

7. Classification of Deaths in North Borneo, 1936.

District.	Total.	Europeans		Natives		Chinese		Malays		Others	
		Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
Bundu Tuhan	135	—	—	85	50	—	—	—	—	—	—
Ranau	278	—	—	170	108	—	—	—	—	—	—
Tambunan	347	—	—	200	147	—	—	—	—	—	—
Keningau	223	—	—	111	103	7	1	1	—	—	—
Sepulot	31	—	—	12	19	—	—	—	—	—	—
Pensiangan	74	—	—	49	25	—	—	—	—	—	—
Tenom	148	—	—	63	50	14	10	8	1	1	1
Sipitang	144	—	—	71	52	9	6	6	—	—	—
Mempakul	287	—	—	142	137	6	2	—	—	—	—
Beaufort	290	—	—	114	113	22	15	12	11	2	1
Papar	323	—	—	143	106	30	23	12	6	2	1
Penampang	169	—	—	81	77	8	1	—	2	—	—
Jesselton	215	—	—	29	25	84	46	13	3	12	3
Mengattal	81	—	—	46	21	6	5	1	2	—	—
Tuaran	301	—	—	147	142	6	4	1	—	1	—
Kota Belud	1,015	—	—	555	446	7	2	1	3	—	1
Kudat	204	—	—	68	58	46	24	6	—	2	—
Langkon	347	—	—	182	159	2	—	1	2	1	—
Labuk & Sugut	282	—	—	142	129	4	5	—	1	1	—
Kinabatangan	241	—	—	128	107	4	—	2	—	—	—
Sandakan	531	—	—	78	58	211	127	33	14	6	4
Tambisan	40	—	—	21	17	1	—	—	—	1	—
Tungku	49	—	—	23	19	3	3	1	—	—	—
Lahad Datu	113	—	—	31	20	32	11	9	5	4	1
Semporna	114	—	—	56	49	4	3	—	2	—	—
Tawau	300	—	—	66	65	66	50	25	6	14	8
	6,282	—	—	2,813	2,302	572	338	132	58	47	20

8. Classification of Deaths from all Causes at different Ages.

District.	AGE GROUP.									Total.
	Under 1 year.	1—4 years.	5—9 years.	10—19 years.	20—29 years.	30—39 years.	40—49 years.	50 years and over.		
Tawau	101	22	10	14	26	38	29	60	300	
Semporna	29	13	7	5	13	23	7	17	114	
Lahad Datu	22	13	1	2	9	14	18	34	113	
Tungku	14	4	—	2	4	12	1	12	49	
Tambisan	20	3	1	2	1	2	3	8	40	
Kinabatangan	60	35	5	17	16	27	42	39	241	
Sandakan	164	43	15	16	39	78	60	116	531	
Labuk & Sugut	86	54	16	11	17	27	14	57	282	
Langkon	89	31	16	23	22	49	53	64	347	
Kudat	69	21	7	10	21	19	21	36	204	
Kota Belud	160	129	51	90	110	142	103	230	1,015	
Tuaran	58	22	14	13	25	45	33	91	301	
Mengattal	18	6	4	4	12	13	10	14	81	
Jesselton	55	25	8	9	19	15	28	56	215	
Penampang	27	25	6	5	12	14	30	50	169	
Papar	76	41	27	15	33	37	27	67	323	
Beaufort	83	30	24	16	16	27	29	65	290	
Mempakul	92	29	8	16	21	21	36	64	287	
Sipitang	38	13	1	5	9	17	21	40	144	
Tenom	12	22	7	5	7	36	18	41	148	
Pensiangan	4	4	3	7	9	14	9	24	74	
Sepulot	6	2	—	1	3	10	4	5	31	
Keningau	46	17	4	11	33	39	29	44	223	
Tambunan	43	42	3	17	36	60	46	100	347	
Ranau	44	19	9	18	29	41	39	79	278	
Bundu Tuhan	15	18	4	8	10	21	29	30	135	
	1,431	683	251	342	552	841	739	1,443	6,282	

9. Registration of births and deaths is compulsory throughout the whole Territory; at the same time these statistics should be accepted with reserve. Owing to the fact that a large part of the Native population of the Interior and West Coast lives in remote villages, the registration of births and deaths is necessarily incomplete.

II.—METEOROLOGY OF NORTH BORNEO.

10. The equipment at Sandakan includes the following instruments:

Mercury barometer,
Stevenson screen with wet and dry bulb Hygrometer and maximum and minimum thermometers,
Five-inch rain-gauge, "Snowdon" Pattern,
Dines pressure tube anemometer recording speed.

The equipment at auxiliary stations at Tawau, Semporna, Kudat, Jesselton, Beaufort, Tenom, Keningau and Tambunan consists of wet and dry bulb Hygrometers, and maximum and minimum thermometers together with a standard rain-gauge of five inches diameter.

In addition standard rain-gauges of five inches diameter are also provided at eighteen other stations.

TEMPERATURE.

11. The mean temperature for the year was 80.5° Fahrenheit and the mean daily range was 16.3 degrees. The recorded extremes were maximum 97° at Beaufort, in the West Coast Residency and minimum 58°, at Tambunan (1,800 feet above sea level) also in the West Coast Residency.

RAINFALL.

12. The mean rainfall for the year, of observations recorded at twenty-seven stations, was 100.1 inches, compared with 102.1 inches in 1935.

Mean Rainfall during the last six years.

Year.	Rainfall in inches.		Year.	Rainfall in inches.	
1936	...	100.1	1933	...	106.9
1935	...	102.1	1932	...	123.6
1934	...	128.4	1931	...	90.1

13. The mean rainfall during the year in each Residency was as follows:—

		Rainfall in inches.	Difference from normal.
West Coast Residency (18 Stations)	...	117.5	+ 11.2 inches
East Coast Residency (9 Stations)	...	100.1	+ 3.8 inches

TELEGRAPHIC REPORTS OF WEATHER INFORMATION.

14. Observations of barometric pressure, temperature, humidity, wind direction and force, visibility, weather and state of the sea were recorded daily at Sandakan at 6 a.m., 9 a.m., 2 p.m. and 8 p.m. and returns incorporating these observations were forwarded at the end of each month to the Director of the Meteorological Office of the Air Ministry in London. Observations taken at 6 a.m. and 2 p.m. were forwarded daily by wireless telegraphy to the Royal Observatory, Hong Kong, and the Superintendent, Malayan Meteorological Service, Singapore.

15. Summary of Meteorological Observations taken at fixed hours at Sandakan.

LATITUDE 5° 50' N. LONGITUDE 118° 07' E.

Hours of observation. { 06h. 00m.
09h. 00m.
14h. 00m.
20h. 00m.

Month.	TEMPERATURE.										PRECIPITATION.			
	Mean of Day at M. S. L. mb.	ABSOLUTE.			MEAN VALUES.			MEAN.			Mean Cloud Amount 0-10.	Amount inches	Difference from normal inches.	Days.
		Max. °F	Min. °F	Max. °F	Max. °F	Min. °F	½ and Min °F	Diff. from Normal °F	Wet Bulb. °F	Relative Humidity %				
January	1009.9	88	72	85.4	73.8	79.6	-0.2	76.1	85	9.0	15.37	- 4.03	21	
February	1011.2	92	72	88.5	74.8	81.7	+1.5	75.5	81	7.0	1.62	- 9.35	5	
March	1010.3	90	72	87.0	75.0	81.0	0.0	77.3	84	8.7	23.86	+ 15.39	21	
April	1008.9	92	74	89.1	76.6	82.9	+0.7	78.4	80	8.0	4.76	+ 0.27	16	
May	1007.9	91	73	89.4	76.5	82.9	+0.4	78.5	81	6.9	9.92	+ 3.59	12	
June	1009.1	92	73	88.7	74.9	81.8	+0.1	76.8	84	7.0	8.10	+ 0.60	15	
July	1008.6	90	73	88.1	75.2	81.7	-0.1	76.4	83	7.7	10.41	+ 3.69	13	
August	1008.6	90	72	87.5	74.4	80.9	-0.9	75.9	83	7.8	9.59	+ 1.70	17	
September	1009.1	91	72	88.7	75.1	81.9	+0.2	76.6	81	7.2	16.73	+ 7.40	19	
October	1009.5	90	73	87.4	74.8	81.1	-0.3	76.5	82	8.0	9.29	- 1.04	20	
November	1010.1	90	73	86.4	74.7	80.6	-0.3	76.3	84	7.1	19.53	+ 4.81	18	
December	1008.8	90	73	86.7	75.2	81.0	+0.8	76.8	86	7.8	19.03	+ 0.39	20	
For Year	1009.3	92	72	87.7	75.6	81.7	+0.4	76.8	83	7.7	148.21	+ 23.42	197	

III.—GOVERNMENT MEDICAL INSTITUTIONS.

16. On 1st January, 1936, there remained 325 patients under treatment in seventeen Government Medical Institutions. During the year 4,250 patients were admitted giving a total under treatment of 4,575 compared with 4,922 in 1935 and 4,481 in 1934. Of the 4,575 patients treated 3,822 were discharged cured, 133 were transferred, 16 absconded, 259 died, and 345 patients remained under treatment on 31st December, 1936.

The mean death rate for all hospitals was 5.7 per cent. compared with 6.2 per cent. in 1935.

EUROPEAN AND 2ND CLASS WARDS.

17. SANDAKAN CIVIL HOSPITAL.—During the year twelve patients were admitted to the European Wards with no deaths compared with 28 patients and no deaths in 1935.

123 patients were admitted to the Second Class wards with 3 deaths compared with 127 admissions and 6 deaths in 1935.

18. JESSELTON CIVIL HOSPITAL.—19 patients were treated in the European Wards with no deaths, compared with 25 patients and 1 death in 1935.

In the Second Class Wards, there were 110 admissions with 6 deaths, compared with 107 admissions and 5 deaths during 1935.

19. The following summary shows the number of in-patients treated in each hospital during the year, 1936 :

In-patients treated in Government Medical Institutions during the year 1936.

Institution.	Remained 1. 1. 36.	Admit- ted.	Total.	Dis- charged.	Transfer- red.	Ab- sconded.	Remained 31. 12. 36.	Death Rate per cent.			
Sandakan Civil Hospital ✓	36	1,245	1,281	1,119	29	—	92	41	7.2		
Sandakan Gaol Hospital ✓	9	83	92	80	—	—	2	10	2.2		
Jesselton Civil Hospital ✓	22	819	841	739	8	5	53	36	6.3		
Jesselton Constabulary Hospital ✓	3	196	199	172	25	—	1	1	0.5		
Jesselton Gaol Hospital ✓	7	87	94	71	19	—	1	3	1.1		
Beaufort Civil Hospital ✓	20	272	292	233	17	—	22	20	7.5		
Kudat Civil Hospital ✓	9	619	628	572	12	3	22	19	3.5		
Tawau Civil Hospital ✓	15	151	166	128	12	1	16	9	9.6		
Semporna Sick Rest House	—	(347)	21	(359)	1	—	(209)	1	—		
Kota Belud Sick Rest House	—	35	35	29	1	1	—	4	—		
Tenom Sick Rest House	5	97	102	81	7	—	5	9	4.9		
Pensiangan Sick Rest House	5	92	97	96	—	—	—	1	—		
Keningau Sick Rest House	11	279	290	273	3	2	8	4	2.8		
Tambunan Sick Rest House	4	227	231	209	—	2	7	13	3.0		
Ranau Sick Rest House	—	23	23	16	—	—	4	3	17.4		
Mental Hospital Sandakan	109	(754)	16	(719)	125	3	—	(24)	20	102	16.0
Leper Colony — Sandakan	70	24	8	(203)	78	1	—	(26)	6	69	7.7
Total	325	4,250	4,575	3,822	133	16	259	345	5.7		
		4248 X	X				X				

IV.—GOVERNMENT OUT-PATIENT DEPARTMENTS AND DISPENSARIES.

20. Summary of Out-patients treated during 1936.

SANDAKAN :

		New Cases.	Repetitions.	Total.
Civil Hospital	...	1,697	16,400	18,097 ✓
Constabulary	...	664	742	1,406
Veneral Clinic	...	170	1,174	1,344
Gaol Hospital	...	1,600	2,126	3,726

JESSELTON :

Civil Hospital	...	6,358	5,229	11,587 ✓
Constabulary Hospital	...	2,563	4,708	7,271
Gaol Hospital	...	905	5,760	6,665
Beaufort Civil Hospital	...	5,347	1,121	6,468 ✓

KUDAT :

Civil Hospital	...	3,749	2,181	5,930 ✓
Gaol Hospital	...	500	2,542	3,042
Tawau Civil Hospital	...	4,572	3,178	7,750 ✓

18/1/36

45/1/1

7/2/6

GOVERNMENT DISPENSARIES :		New Cases.	Repetitions.	Total.
Semporna	...	3,701	3,990	7,691
Kota Belud	...	6,859	1,608	8,467
Tuaran	...	4,348	476	4,824
Papar	...	11,307	7,581	18,888
Mempakul	...	4,026	2,158	6,184
Sipitang	...	4,342	170	4,512
Tenom	...	3,861	798	4,659
Pensiangan	...	7,079	13,973	21,052
Keningau	...	15,311	8,506	23,817
Tambunan	...	13,113	4,476	17,589
Ranau	...	9,878	2,621	12,499
Bundu Tuhan	...	<u>9,577</u>	<u>374</u>	<u>9,951</u>
TRAVELLING DISPENSARIES :				
Kudat and Marudu Bay	...	3,438	—	3,438
Labuk and Sugut	...	877	2	879
Kinabatangan	...	687	—	687
Total		<u>126,529</u>	<u>91,894</u>	<u>218,423</u>

21. The total number of out-patients treated during the year amounted to 218,423 compared with 198,398 in 1935, an increase of 20,025 patients or 10.1 per cent.

Summary of Out-patients treated during the past six years.

Year.		Number of patients treated.
1936	..	218,423
1935	..	198,398
1934	..	174,899
1933	..	156,707
1932	..	153,447
1931	..	124,670

22. The figures under Beaufort Civil Hospital in the above summary include patients treated at quarterly clinics held by the District Surgeon, Dr. J. C. T. Tregarthen, at Gadong, Weston, Bukau, and Limbawang. Under Tawau the number of patients treated include those attending the weekly clinics at the Chinese settlements at Apas and Sin On. At Tuaran the figures include patients treated at the weekly clinics at Mengattal, Penampang, Putatan and Kinarut and patients treated at the weekly clinics at Kabang, Kimanis, Bangawan, and Membakut are included in the figures under Papar.

23. During the year the District Surgeon, Beaufort and Interior, Dr. J. C. T. Tregarthen, made three extended tours through the Interior; during March and April, he toured the Bokan country between Keningau and the headwaters of the Kinabatangan River, 1,014 patients were examined and treated at twelve centres, Keningau, Kindasan, Pau, Tulid, Lanas, Linsok, Kuit, Sook, Bunang, Mapila and Tetegap.

In June and July, Dr. Tregarthen visited the Government Dispensaries at Tenom, Keningau, Tambunan, Ranau and Bundu Tuhan, at which large numbers of patients were seen and examined; in addition, clinics were held at Apin Apin, Perutan, Bebagan, Kerokot, Mensangoh, Pendagong, Kindasan, Teboh, Libang, Pahu Pahu, Sensuran, Tekolod and Bingkor. In all 6,039 Natives attended the various clinics and received treatment.

In September and October, Dr. Tregarthen visited the Government Dispensary at Pensiangan; the outward journey was made by the bridle path via Sepulot and the return journey by native tracks through the Dalit country: Treatment centres were arranged at Tetagup, Sook, Nebawan, Pendiwan, Matiku, Sepulot, Agis, and Sigattal on the journey southwards and at Sibungoh, Semputian, Sinapari, Pohan Batu, Remidi, Malaing, Kelampun, Punti and Bia on the return journey. 2,312 natives were examined and treated at the various clinics.

V.—PREVAILING DISEASES.

MALARIA.

24. The following table shows the number of malaria admissions to and deaths in Government Hospitals during the year 1936:—

SANDAKAN—		Admissions.	Deaths.
Civil Hospital	..	208	12
Gaol Hospital	...	6	—
JESSELTON—			
Civil Hospital	...	179	7
Constabulary Hospital	...	37	—
Gaol Hospital	...	6	—
Beaufort Civil Hospital	...	40	2
Kudat Civil Hospital	...	33	4
Tawau Civil Hospital	...	30	2
Semporna Sick Rest House	...	—	—
Kota Belud Sick Rest House	...	—	—
Tenom Sick Rest House	...	23	—
Pensiangan Sick Rest House	...	2	—
Keningau Sick Rest House	...	34	—
Tambunan Sick Rest House	...	22	1
Ranau Sick Rest House	...	10	—
		630	28
		—	—

During the year 1935, there were 761 cases of malaria admitted to Government Hospitals with 39 deaths.

25. *Blackwater fever*.—Kudat and Beaufort Civil Hospitals reported 4 cases and 1 case of Blackwater fever respectively with recovery in all five cases. Jesselton Civil Hospital reported 1 case and 1 death from Blackwater fever and no cases were reported from either Sandakan or Tawau.

26. *Prevailing type of malaria*. The following table shows the relative frequency of the three species of malaria parasites seen in positive blood films at Government Hospitals and Dispensaries:

Hospital.	Number of films examined.	positive.	Subtertian parasites found in per cent.	Benign parasites found in per cent.	Tertian parasites found in per cent.	Quartan parasites found in per cent.	Mixed Infection per cent.
Tawau	...	105	74	41.9	39.2	14.9	4.0
Sandakan	...	804	123	32.5	56.1	8.1	3.3
Kudat	...	146	33	36.4	48.5	3.0	12.1
Jesselton	...	503	69	13.0	68.1	5.8	13.1
Beaufort	...	170	25	44.0	32.0	4.0	20.0
Tenom	...	146	74	41.9	56.8	1.3	Nil
Pensiangan	...	30	21	28.5	66.6	4.9	Nil
Keningau	...	232	27	14.8	74.1	7.4	3.7
Tambunan	...	267	20	70.0	25.0	5.0	—
Total	...	2,403	466	33.9	53.6	6.9	5.6

27. The District Surgeon, Interior, Dr. J. C. T. Tregarthen, during his tour of the Bokan country during March and April, 1936, examined 1,014 natives and found the spleen to be enlarged in 633 or 62.4 per cent. The average projection below the coastal margin, in centimetres was as follows:—

Infants	...	7.8 centimetres.	Adult males	...	6.1 centimetres.
Children under 16	...	6.5 centimetres.	Adult females	...	7.2 centimetres.

The spleen rate as recorded in the various villages visited was as follows:

Village.	No. of persons examined.	No. of persons with enlarged spleen.	Spleen rate per cent.
Keningan	...	269	139
Kendassan	...	65	47
Pau	...	136	69
Tulid	...	92	72
Lanas	..	56	28
Linsok	...	101	78
Kuit	...	68	54
Sook	...	51	32
Bunang	...	72	45
Mapila	...	60	42
Tetegup	...	44	29
Totals and mean spleen rate	1,014	635	62.6

28. In June and July 1936, Dr. Tregarthen examined 6,039 natives at various centres between Keningau and Bundu Tuhan and found the spleen to be enlarged in 5,883 or 97.4 per cent. In 1935 during a similar tour an enlarged spleen was found in 92.6 per cent of 4,125 persons examined.

In 3,104 cases the projection of the spleen below the coastal margin was measured and the following average projection was found :

Infants	...	5.8 centimetres.
Children under 16	...	7.2 centimetres.
Adult males	...	9.1 centimetres.
Adult females	...	9.3 centimetres.

29. In September and October, 1936, Dr. Tregarthen visited the Government Dispensary at Pensiangan, he examined 2,312 Natives en route and found the spleen enlarged in 2,280 or 98.6 per cent.

In 1,656 cases the projection of the spleen below the coastal margin was measured and the following average projection was found :

Infants	...	5.3 centimetres.
Children under 16	...	8.0 centimetres.
Adult males	...	8.5 centimetres.
Adult females	...	9.3 centimetres.

BERI-BERI.

30. The following table shows the number of cases of Beri-beri admitted to Government Hospitals during the year 1936 with the number of deaths :—

SANDAKAN—		Admissions.	Deaths.
Civil Hospital	...	102	8
Gaol Hospital	...	2	—
JESSELTON—			
Civil Hospital	...	13	1
Constabulary Hospital	...	4	—
Gaol Hospital	...	1	—
Beaufort Civil Hospital	...	8	1
Kudat Civil Hospital	...	12	1
Tawau Civil Hospital	...	19	1
Keningau Hospital	...	3	—
		<hr/> 164	<hr/> 12
		<hr/>	<hr/>

31. Summary of cases of Beri-beri treated in Government Hospitals during the past five years :

Year.	Admissions.	Deaths.
1936	164	12
1935	131	12
1934	185	20
1933	58	1
1932	73	4

32. The number of cases admitted to Government hospitals during the year, is rather higher than in 1935, but less than in 1934, as in previous years about half the total number of cases were admitted to Sandakan Civil Hospital. On examination it was found that the 102 cases admitted to this hospital were derived from the following sources :—

Constabulary Barracks	...	28 cases
Sandakan Town	...	38 ,,
Suburbs of Sandakan	...	12 ,,
Outlying Logging Camps	...	11 ,,
Other districts	...	13 ,,
<hr/> Total		102 cases.
<hr/>		

all the cases occurring among the Constabulary were of a mild type and little disability was experienced beyond some weakness of the calf muscles; it was found on enquiry that the rice on issue to the Constabulary Mess was highly polished and appeared to be similar to a sample sent to the Medical Research Institute in Kuala Lumpur in 1934 which was adversely reported on as a beri-beri producing rice if eaten without other foodstuffs producing an adequate supply of Vitamin B. The food value of the diet issued to the Mess was also examined and found to be deficient in protein and fat in addition to Vitamin B. It was in consequence recommended that the issue of rice be reduced from 20 tahils to 16 tahils, that the ration of beef be increased from 3 tahils to $5\frac{1}{2}$ tahils and fresh fish from 3 tahils to $6\frac{1}{4}$ tahils and that 3 tahils of soya beans and 1 tahil of bean oil or animal fat be added to the daily ration. This diet scale was introduced on 1st June and no further cases of beri-beri occurred among the Constabulary.

33. Many of the cases of beri-beri shown under the heading of Sandakan Town were really derived from outlying logging camps and gave on admission to hospital addresses of lodging houses in the town.

Yaws.

34. 7,162 cases of Yaws were treated during the year 1936 as follows:—

		New cases.	Repetitions.	Total.
WEST COAST RESIDENCY				
Bundu Tuhan	...	204	6	210
Ranau	...	362	4	366
Tambunan	...	270	12	282
Keningau	...	293	46	339
Pensiangan	...	384	7	341
Tenom	...	12	3	15
Sipitang	...	195	—	195
Mempakul	...	53	27	80
Beaufort	...	2	—	2
Membakut	...	156	—	156
Bangawan	...	69	—	69
Kimanis	...	28	—	28
Kabang	...	127	—	127
Papar	...	751	—	751
Kinarut	...	164	9	173
Putatan	...	228	24	252
Penampang	...	192	20	212
Jesselton	...	14	—	14
Mengattal	...	166	9	175
Tuaran	...	203	22	225
Kota Belud	...	546	245	791
EAST COAST RESIDENCY				
Kudat	...	335	—	335
Marudu Bay	...	1,359	—	1,359
Labuk and Sugut	...	229	—	229
Sandakan	...	4	7	11
Kinabatangan	...	208	—	208
Semporna	...	129	29	158
Tawau	...	54	5	59
		6,687	475	7,162

35. The following summary shows the number of cases of yaws treated during the past five years:—

Year.		West Coast Residency.	East Coast Residency.	Total.
1936	...	4,803	2,359	7,162
1935	...	6,052	1,573	7,625
1934	...	5,862	2,013	7,875
1933	...	6,288	2,397	8,685
1932	...	5,189	1,632	6,821

DYSENTERY

36. 227 cases of dysentery were admitted to Government hospitals during 1936 with 15 deaths:—

	Admissions.	Deaths.
SANDAKAN—		
Civil Hospital	... 33	7
Gaol Hospital	... 15	—
JESSELTON—		
Civil Hospital	... 33	3
Constabulary Hospital	... 2	—
Gaol Hospital	... 7	—
Beaufort Civil Hospital	... 17	1
Kudat Civil Hospital	... 30	2
Tawau Civil Hospital	... 4	—
Tenom Sick Rest House	... 10	—
Pensiangan Sick Rest House	... 5	—
Keningau Sick Rest House	... 39	1
Tambunan Sick Rest House	... 29	—
Ranau Sick Rest House	... 3	1
	227	15

PNEUMONIA.

37. 77 cases of lobar pneumonia were admitted to Government hospitals during 1936, with 30 deaths, compared with 77 cases and 34 deaths in 1935. No cases of pneumonia were recorded in the Constabulary or Prison hospital at Jesselton, two cases were admitted to the Prison hospital in Sandakan.

PULMONARY TUBERCULOSIS.

38. 82 cases of pulmonary tuberculosis were admitted to Government hospitals with 26 deaths compared with 60 cases and 22 deaths in 1935.

ANKYLOSTOMIASIS.

39. The control of ankylostomiasis initiated in 1921 by the Rockefeller Institute, under the supervision of Dr. Clark H. Yeager, was continued during the year 1936. In Sandakan and Jesselton this work is carried out by a special staff and all Government Servants, schoolchildren, and labourers employed on small estates in the vicinity of these towns are examined twice yearly for hookworm infection and treated if necessary. In Sandakan and Jesselton 8,286 persons were examined of whom 469 were found to be infected with Hookworm disease, the infection rate was 5.7 per cent. In all 11,055 treatments were administered, this figure includes mass treatment, without previous examination, to the inhabitants of Inanam, Mengattal, Telipok, Tuaran, Penampang, Jesselton, Tanjong Aru, Sembulan, Putatan, Kinarut and Kawang.

40. The following summary shows the infection rate during the past twelve years:—

Year.	Infection rate per cent.	Year.	Infection rate per cent.
1936	5.7	1929	5.4
1935	4.2	1928	10.
1934	5.4	1927	17.
1933	4.9	1926	18.
1932	5.3	1925	39.
1931	4.5	1924	71.
1930	4.7		

41. In other districts treatments were given by the staff of Government Hospitals and Dispensaries; during the course of Dr. Tregarthen's three tours through the Interior, mass treatment was administered to 7,453 natives.

VI.—SURGICAL OPERATIONS.

42. The number of surgical operations performed in Government Hospitals during the year, 1936, amounted to 357, compared with 464 in 1935. The following summary shows the number of operations performed at each hospital:—

	Major.	Minor.	Total.
Sandakan Civil Hospital	6	52	58
Jesselton Civil Hospital	11	103	114
Beaufort Civil Hospital	1	45	46
Kudat Civil Hospital	2	33	35
Tawau Civil Hospital	—	5	5
Tenom Dispensary	1	23	24
Pensiangan Dispensary	—	16	16
Keningau Dispensary	—	52	52
Tambunan Dispensary	—	7	7
Ranau Dispensary	—	—	—
	21	336	357
	—	—	—

In addition to the above 4,648 dental extractions were performed at the various treatment centres in the Interior during the year 1936.

VII.—POSTMORTEM EXAMINATIONS.

43. 52 post-mortem examinations were performed during the year in Government hospitals compared with 52 in 1935. The following summary shows the number performed at each hospital:—

Sandakan Civil Hospital	...	22
Jesselton Civil Hospital	...	21
Beaufort Civil Hospital	...	1
Kudat Civil Hospital	...	2
Tawau Civil Hospital	...	—
Tenom Dispensary	...	1
Keningau Dispensary	...	1
Tambunan Dispensary	...	1
Ranau Dispensary	...	3
	—	—
Total	...	52
	—	—

VIII.—LABORATORY EXAMINATIONS.

44. EXAMINATIONS OF BLOOD FILMS FOR MALARIAL PARASITES.

	No. of films examined.	SPECIES OF PARASITES FOUND.					No. of films found negative.
		Larverania Malariae.	Plas- medium vivax.	Plas- medium	Plas- medium malariae.	Mixed infec- tion.	
Sandakan Civil Hospital	...	804	40	69	10	4	681
Jesselton Civil Hospital	...	503	9	47	4	9	434
Beaufort Civil Hospital	...	170	11	8	1	5	145
Kudat Civil Hospital	...	148	12	16	1	4	115
Tawau Civil Hospital	...	105	31	29	11	3	31
Tenom Dispensary	...	146	31	42	1	—	72
Pensiangan Dispensary	...	30	6	14	1	—	9
Keningau Dispensary	...	232	4	20	2	1	205
Tambunan Dispensary	...	267	14	5	1	—	247
	—	—	—	—	—	—	—
	2,405	158	250	32	26	—	1,939
	—	—	—	—	—	—	—

45. PREVAILING TYPE IN FILMS FOUND POSITIVE.

Plasmodium vivax	...	53.6 per cent.
Laverania malariae	...	33.9 „
Plasmodium malariae	...	6.9 „
Mixed infection	...	5.6 „

EXAMINATION OF FACES FOR INTESTINAL PARASITES.

46. The following table shows the various intestinal parasites seen in the films examined :—

	Sandakan Civil Hospital.	Jesselton Civil Hospital.	Beaufort Civil Hospital.	Kudat Civil Hospital.	Tawau Civil Hospital.	Tenom Dispensary.	Pensiangan Dispensary.	Keningau Dispensary.	Tambunan Dispensary.	Total.	
Ankylostoma duodenale and Strongyloides stercoralis	...	26	68	30	24	12	16	2	40	13	231
Ankylostoma duodenale and Entamoeba histolytica	5	16	...	...	2	...	...	23	23
Ankylostoma duodenale, Strongyloides stercoralis and Ascaris lumbricoides	...	2	...	1	...	...	...	...	...	3	3
Ankylostoma duodenale, Strongyloides stercoralis and Tricocephalus dispar	11	...	...	...	2	...	13	13
Ankylostoma duodenale, Strongyloides stercoralis, Ascaris lumbricoides and Tricocephalus dispar	...	1	...	8	...	...	...	...	...	9	9
Ankylostoma duodenale and Ascaris lumbricoides	1	4	...	...	...	...	5	5
Ankylostoma duodenale, Ascaris lumbricoides and Tricocephalus dispar	...	3	19	66	6	2	9	4	4	113	113
Ankylostoma duodenale, Ascaris lumbricoides and Entamoeba histolytica	...	1	4	17	...	...	...	...	...	22	22
Ankylostoma duodenale and Tricocephalus dispar	28	...	...	3	1	4	4
Ankylostoma duodenale and Oxyuris vermicularis	...	2	...	...	...	3	5	4	2	54	54
Strongyloides stercoralis	12	18	7	5	5	...	...	2	2
Strongyloides stercoralis and Ascaris lumbricoides	...	2	2	2	5	3	3	1	...	14	47
Strongyloides stercoralis and Tricocephalus dispar	...	1	2	3	2	...	...	...	...	27	27
Strongyloides stercoralis, Ascaris lumbricoides and Tricocephalus dispar	1	2	...	...	...	...	8	8
Strongyloides stercoralis, Ascaris lumbricoides and Oxyuris vermicularis	2	...	...	...	...	...	3	3
Ascaris lumbricoides	...	84	156	27	64	36	12	30	28	87	524
Ascaris lumbricoides and Tricocephalus dispar	...	4	71	29	5	5	5	4	4	25	156
Ascaris lumbricoides and Entamoeba histolytica	...	1	2	1	1	...	...	1	1	11	16
Ascaris lumbricoides, Tricocephalus dispar and Entamoeba histolytica	1	1	...	...	...	...	...	1
Ascaris lumbricoides and Clonorchis sinensis	2	...	...	...	...	...	2	2
Ascaris lumbricoides and Oxyuris vermicularis	...	1	1	...	...	...	...	...	...	...	2
Tricocephalus dispar	...	46	101	5	4	14	2	2	2	6	182
Clonorchis sinensis	3	...	...	...	...	...	...	1	1
Clonorchis sinensis and Entamoeba histolytica	1	...	...	...	1	...	1	1
Oxyuris vermicularis	4	...	...	...	...	...	...	4	4
Entamoeba histolytica	...	67	112	23	9	12	8	43	25	303	303
Negative films	...	653	642	173	33	37	65	96	93	1,902	1,902
TOTAL	...	909	1,224	460	227	107	99	230	281	3,864	3,864

47. Of the 3,664 specimens of faeces examined, 5 specimens contained four different varieties of parasites, 55 specimens contained three varieties, 407 specimens contained two varieties, 1,295 specimens contained a single variety and 1,902 were negative.

48. The following summary shows the infection rate of the three most prevalent intestinal parasites:—

Institution.	Ankylostoma duodenale. per cent.	Ascaris lumbricoides. per cent.	Tricocephalus dispar. per cent.
Sandakan Civil Hospital	...	3.8	10.6
Jesselton Civil Hospital	...	8.6	21.2
Beaufort Civil Hospital	...	37.2	35.9
Kudat Civil Hospital	...	13.2	34.4
Tawau Civil Hospital	...	13.4	40.2
Tenom Dispensary	...	30.3	27.3
Pensiangan Dispensary	...	1.9	28.0
Keningau Dispensary	...	23.9	18.3
Tambunan Dispensary	...	7.1	50.5
			11.7

49.

MISCELLANEOUS EXAMINATIONS.

Sandakan Civil Hospital.	Jesselton Civil Hospital.	Beaufort Civil Hospital.	Kudat Civil Hospital.	Tawau Civil Hospital.	Tenom Dispensary.	Pensiangan Dispensary.	Keningau Dispensary.	Tambunan Dispensary.
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GONORRHOEA

Urethral smears

Positive	20	25	48	1	2	4	433	457	—	910
Negative	5	4	178	2	—	14	232	250	—	685

Vaginal smears

Positive	46	—	4	—	3	—	5	1	—	59
Negative	136	—	—	—	—	—	—	—	—	130

LEPROSY.—

Nasal smears

Positive	2	6	—	—	—	—	—	—	—	—
Negative	—	13	1	—	—	—	—	—	—	—

Smears from nodules

Positive	4	—	—	—	—	—	—	—	—	—
Negative	10	—	—	—	—	—	—	—	—	—

TUBERCULOSIS (SPUTUM)

Positive	26	22	12	7	6	1	—	1	3	78
Negative	89	229	55	13	10	13	—	8	4	421

DIPHTHERIA.—(THROAT SWABS)

Positive	2	2	—	—	—	—	—	—	—	—
Negative	1	3	—	—	—	—	—	—	—	—

EXAMINATION OF EXHIBITS FOR PRESENCE OF ALCOHOL.

50. During the year 14 specimens of distilled liquor and 4 specimens of fermented rice were examined in the office of the Principal Medical Officer. In 13 specimens of liquor the weight of alcohol per cent. was found to vary from 3.31 to 59.37 and these in consequence came under the definition of "Intoxicating Liquors". The remaining exhibit showed an alcohol content of 0.53 per cent. by weight. The four specimens of fermented rice were proved to contain alcohol.

TOXICOLOGICAL EXAMINATIONS.

51. Portions of viscera were received from Melalap for toxicological examination and examined but no poison was detected.

MISCELLANEOUS.

52. Other exhibits examined consisted of cough tablets for presence of morphine, tablets for presence of arsenic, powdered glass, a substance supposed to be ambergris, a piece of ginger found in the bronchus of a newly born infant.

IX.—SANDAKAN MENTAL HOSPITAL.

53. The number of patients remaining under treatment at the end of the year, 1936, was 102, a decrease of 7 patients compared with the previous year.

54.

		Males.	Females.	Total.
Remaining on 1st January, 1936	...	88	21	109
Admitted during 1936	...	10	6	16
Discharged during the year	...	3	—	3
Died	...	14	6	20
Remaining on 31st December, 1936	...	81	21	102

Percentage of recoveries 18.7 per cent.

Percentage of deaths on total treated 16.0 per cent.

55. *Admissions.*—There were 16 admissions during the year compared with 26 admissions in 1935. Of the 16 admissions, 6 were from Sandakan, 2 from Lahad Datu and 1 each from the Keningau, Beaufort, Papar, Penampang, Jesselton, Kota Belud, Kudat and Labuk districts. Seven of the cases were suffering from Dementia, five from Dementia praecox, two from Mania, one from Melancholia and one from Menapausal insanity.

56. *Discharges.*—Three patients were discharged as cured during the year compared with two patients in 1935.

57. *Deaths.*—Twenty deaths occurred in the Mental Hospital during the year compared with twenty deaths in 1935. Amoebic dysentery caused twelve deaths, chronic nephritis four deaths, cerebral haemorrhage two deaths and pneumonia two deaths.

58. *Injuries.*—Several cases of minor injury occurred during the year as a result of quarrels among the patients and one patient died from cerebral haemorrhage as a result of striking his head on the cement floor when pushed over by a fellow patient.

59. *Occupation.*—Patients capable of working were employed in metalling the road between the Mental Hospital and the Main Barracks; also in carrying water, cleaning and scavenging, gardening, and cooking.

60. *Water Supply.*—The pipe borne water supply to the Mental Hospital was completed in October, 1936, and an ample supply of water is now available in the hospital for all purposes. The water is obtained from an excellent spring near the Main Barracks from which it is pumped by hand to a tank situated midway between the spring and the hospital, from this intermediate tank it is again pumped to a large cement reservoir close to the hospital fence, from this it is piped to the hospital kitchen and to the female compound.

61. *Board of Visitors.*—Twelve meetings were held by the Board of Visitors during the course of the year at the Mental Hospital.

X.—LEPER SETTLEMENT.

62. On the 1st January, 1936, 70 patients suffering from Leprosy remained under treatment in the Settlement; during the year there were 8 admissions, compared with 16 in 1935, one patient was discharged from the Settlement, 2 absconded and 6 died; 69 patients remained under treatment on 31st December, 1936.

63. *Admissions.*—Seven of the eight admissions were Chinese, three from Jesselton, one from Sandakan, one from Jesselton, one from Tenghilan and one from Bangawan Estate, the remaining admission a male Dusun came from Penampang.

64. *Discharges.*—One male Chinese was discharged from the Settlement in June, 1936, this man returned to his employment as a timber squarer with the British Borneo Timber Company at Semporna.

65. *Abscondings.*—Two patients absconded from the Settlement during the year and neither of them have been traced up to the present time.

66. *Deaths.*—Six deaths occurred in the Settlement during the year, two from senile decay, two from leprous cachexia and exhaustion, one from pneumonia and one from chronic bronchitis.

67. Nationality and sex of patients under treatment in the Settlement:—

		Remained 1. 1. 36.	Admitted.	Discharged.	Absconded.	Died.	Remained 31. 12. 36.
Natives of the State							
Male	...	19	1	—	1	1	18
Female	...	1	—	—	—	—	1
Chinese							
Male	...	47	6	1	1	5	46
Female	...	1	1	—	—	—	2
Javanese							
Male	...	1	—	—	—	—	1
Female	...	1	—	—	—	—	1
		—	—	—	—	—	—
		70	8	1	2	6	69
		—	—	—	—	—	—

68. Summary of patients under treatment during the past five years.

Year.		Remained 1st January.	Admitted.	Discharged.	Absconded.	Died.	Remained 31st December.
1936	...	70	8	1	2	6	69
1935	...	66	16	—	4	8	70
1934	...	64	12	—	5	5	66
1933	...	56	19	3	2	6	64
1932	...	53	8	—	—	5	56

69. Treatment was administered by intramuscular injection of pure hydnocarpus oil with creasote, 4 c. c. of the latter to 100 c. c. of hydnocarpus oil. The injections were given weekly and the amount injected gradually increased from 2 c. c. to 20 c. c. 52 patients were treated regularly and 1,881 injections were given during the course of the year.

XI.—VENEREAL CLINIC, SANDAKAN.

70. The Venereal Clinic opened in Sandakan in 1927, continued to do useful work during the year 1936. The number of new cases applying for treatment 63 was the same as in 1935, but the total number of attendances increased from 223 in 1935 to 271 in 1936. In addition 107 Chinese prostitutes attended the Clinic and received 996 treatments.

71. The following cases applied for treatment during the year:—

	New cases.	Repetitions.	Total.
Primary syphilis	...	14	42
Secondary syphilis	...	1	15
Tertiary syphilis	...	7 1/2	44
Gonorrhoea	...	24	87
Gonorrhoeal rheumatism	...	13	69
Orchitis	...	3	12
Bubo	...	1	2
	—	—	—
	63	208	271
	—	—	—

72. Nationality and sex of cases treated.

	New cases.	Repetitions.	Total.
Chinese			
Male	...	56	241
Female	...	3	12
Natives of the State			
Male	...	1	3
Female	...	—	—
Other races			
Male	...	3	15
Female	...	—	—
	—	—	—
	63	208	271
	—	—	—

73. Number of intravenous injections of Novarsenobillon administered	159
Number of intra-muscular injections of Gonargin administered	59
Number of intra-muscular injections of Gono-Yatren administered	6
Number of intra-muscular injections of Colossal iodine administered	12
Number of prescriptions dispensed	35

74. Syphilis is uncommon among the native population and offers no problem; Gonorrhoea on the other hand is very prevalent in certain districts of the Interior, the Bokan country and the Keningau and Pensiangan districts. When travelling through the Bokan country during 1936, Dr. Tregarthen found 362 natives, out of 1,014 examined, with symptoms of gonorrhoea, smears were taken from the 362 and 280 or 77.4 per cent. were found positive; similarly out of 765 natives examined in the Keningau district 244 gave a history of gonorrhoea and 140 or 57.4 per cent. of the 244 smears were positive. In the Pensiangan district 1,547 natives were examined, smears taken from 648 and 417 or 64.3 per cent. were found positive.

XII.—VACCINATION AGAINST SMALLPOX.

75. During the year 12,247 vaccinations against smallpox were performed compared with 12,012 vaccination during the year 1935. Successful results were recorded in 80.5 per cent. of those examined.

76. At the beginning of the year only one Government Vaccinator was available, Abdullah, who worked throughout the year in the Jesselton and Tuaran Districts, two additional Vaccinators were appointed in March, Akang and Mohamed Daud, both these men were trained in Sandakan and, when efficient, Akang was sent to the Papar district, and Mohamed Daud to the Kinabatangan district. Vaccinations recorded in other districts were performed by Dressers attached to Government Civil Hospitals and Dispensaries.

77. The following summary shows the number of vaccinations performed in each district during the year 1936:—

RESULT.					
	Total Vaccinated.	Perfect.	Modified.	Failed.	Not seen.
WEST COAST RESIDENCY.					
Tambunan	...	42	16	—	6
Keningau	...	177	8	—	4
Pensiangan	...	84	2	—	—
Tenom	...	170	26	1	2
Sipitang	...	111	100	8	3
Mempakul	...	190	59	27	8
Beaufort	...	380	263	—	44
Papar	...	2,806	586	94	166
Jesselton	...	1,448	103	—	19
Tuaran	...	2,341	869	—	423
EAST COAST RESIDENCY.					
Kudat	...	291	267	1	8
Sandakan	...	2,442	420	13	5
Kinabatangan	...	1,364	377	6	45
Tawau	...	401	139	89	108
Total	...	<u>12,247</u>	<u>3,235</u>	<u>239</u>	<u>841</u>
					<u>7,932</u>

XIII.—PROVISION OF MIDWIVES.

78. At the beginning of the year 1936, three certified midwives were in private practice in Sandakan and one in Jesselton, in addition one certified midwife was attached to the Staff of the Civil Hospital, Sandakan, and one to the staff of Dr. V. A. Stooke's Clinic, also in Sandakan. During the year the names of seven additional midwives were added to the Register, three of these were in possession of certificates recognised as entitling to registration, the remaining four after passing an examination in midwifery and maternity nursing were granted certificates as provided by the Midwives Ordinance.

79. The two Probationer Midwives who completed their course of training at the end of 1936, were both successful in the examination held in December, one went to work in the Jesselton district and the other to Beaufort for work in the Beaufort district.

XIV. ANTI-MALARIAL WORK.

80. The Anti-malarial measures initiated in 1929 were continued during the year 1936. The area under control consists of the streams and water courses in seven ravines in the Sanitary Board area, and earth drains, seepage areas, and other potential breeding places in the North Road, Ernestina Road, Beatrice Road, Hospital Road, Singapore Road, Guillemard Road, Church Road, Jalan Anam, and Leila Road, the grounds of the Wireless Station, Main Barracks, Prison, and the vicinity of the Mental Hospital.

81. In October *A. maculatus* and *A. leucosphyrus* were found breeding in seepage water in a small ravine off the Beatrice Road arrangements were made for this spot to be included in the regular weekly oiling programme, and orders were issued for two unprotected wells in the vicinity to be filled in or adequately protected. Three other shallow surface wells in the vicinity of *Westward Ho* and *Highfield* bungalows were also dealt with in December as a result of *A. leucosphyrus* having been found breeding in one of the wells. Five chains of earth drains were also constructed in waterlogged ground on the north side of the Leila Road in the village of Spargalaim.

82. Two labourers were employed throughout the year under the supervision of a Field Assistant, and a third man was added to the gang during the second and third quarters. Oil spraying was carried out by means of a pneumatic knapsack sprayer and 1,984 gallons of oil were used.

JESSELTON.

83. The area under control consists of streams, ditches, potential breeding places in roadside drains, seepages, and swamps in the vicinity of Victoria Barracks, Victoria Valley, north side of the Civil Hospital, Railway Clerks Quarters, Railway Hotel, Jesselton Ice and Power Station, Atkinson Road and South Road also the valley between the Roman Catholic Church and Government Cottage.

84. *Labour*.—Two labourers were employed throughout the year, under the supervision of a Field Assistant, in oiling and upkeeping the various earth drains. Oiling was carried out by means of the brushing method. 782 gallons of oil were used during the year.

85. Anti-malarial work in the vicinity of the Government Stations at Tenom and Keningau was also continued during the year by means of Prison labour, 213 gallons of oil were used at the two Stations.

XV.—X-RAY INSTALLATIONS.

86. The new X-Ray unit installed in the Civil Hospital, Sandakan, giving a rated output of 50 mA. at 90 kV. continued to give good service during the year. 32 screen examinations were carried out and 27 radiographs were made. In September the milliamperc meter ceased to function and had to be returned to the United Kingdom for repair, the escapement valve in the timer also became choked with dust resulting in faulty timing for film exposures, but this was rectified without difficulty.

87. The old X-Ray unit in Sandakan was transferred to Beaufort and erected in the Civil Hospital, and the power for this unit was obtained from a motor generator established under the X-Ray room. This unit is old but is sufficient for the examination of bones of the extremities.

88. The installation in the Civil Hospital, Jesselton, is similar to the unit transferred to Beaufort—a new installation similar to the one in Sandakan is to be provided in 1938.

XVI.—PORT HEALTH WORK AND QUARANTINE.

89. Sandakan is the principal port of the State, other ports are Jesselton, Kudat, Lahad Datu, Semporna and Tawau. A Quarantine Station is maintained on the island of Berhala, about three miles from Sandakan.

90. At Sandakan, 51 vessels from Hong Kong, 2 from Zamboanga, 1 from Miki, 1 from Batavia and 1 from Bangkok, a total of 56 vessels were boarded on arrival by the Port Health Officer; 7,084 passengers and 4,799 crew or 11,883 persons in all were examined.

91. At Jesselton 1 vessel from Singapore was examined by the Port Health Officer and 111 crew and 87 passengers were examined.

92. At Tawau, 5 vessels from Hong Kong were examined and one from Osaka, 392 crew and 221 passengers were examined, a total of 613 persons.

INFECTED VESSELS.

93. No infected vessels were reported in the State during the year.

DESTRUCTION OF RATS IN THE PORT OF SANDAKAN.

94. 1,561 rats were caught and destroyed in the port of Sandakan during the year 1936, 632 rats were examined but none found infected with plague.

DERATIZATION OF SHIPS.

95. One vessel was fumigated during the year by burning sulphur in open pans, 77 rats were destroyed by the fumigation.

LEAGUE OF NATIONS HEALTH ORGANISATION, EASTERN BUREAU.

96. The weekly bulletin of epidemiological information, issued by the Eastern Bureau in Singapore, and broadcast from Malabar (Java) every Saturday morning was received regularly throughout the year. A summary of the bulletin was broadcast in clear each Sunday morning from the Sandakan Wireless Station at 0100 hour, G. M. T.

XVII.—DANGEROUS INFECTIOUS DISEASE.

97. No cases of Cholera, plague, smallpox or cerebro-spinal meningitis were reported in the State during the year.

XVIII.—ESTATES AND COMMERCIAL COMPANIES.

98. The health of the labour force employed on the various Rubber and Tobacco Estates and Logging Camps was good throughout the year. The labour force employed increased from 9,543 on 1st January to 13,307 on 31st December. The average sick rate for the year for in-patients was 1.6 per cent. compared with 1.4 per cent. in 1935. The death rate per mille was 11.1 compared with 14.7 per mille the previous year.

99. Taking the figures as on the 30th June in each year as the average annual labour force, the following table shows the average estate labour force, the number of deaths and the death rate during the past five years.

Year.	Average labour force.	No. of deaths.	Death rate per mille.
1936	...	11,142	124
1935	...	11,083	162
1934	...	10,430	150
1933	...	8,535	123
1932	...	9,135	126

PREVAILING DISEASES AMONG ESTATE LABOURERS.

100. *Malaria*.—1,734 cases of malaria were admitted to hospital during the year compared with 2,097 in 1935 and 2,620 in 1934. The morbidity rate was 15.6 per cent. compared with 23.6 per cent. in 1935. There were 31 deaths from this disease during the year compared with 19 deaths the previous year.

101. *Beri-beri*.—161 cases of beri-beri with 5 deaths were admitted to hospital during the year compared with 152 cases and 10 deaths in 1935. The morbidity rate was 1.4 per cent. compared with 1.4 per cent. in 1935.

102. *Pneumonia*.—120 cases of pneumonia were admitted to hospital during the year with 32 deaths, compared with 122 cases and 40 deaths in 1935. The morbidity rate was 1.1 per cent. compared with 1.1 per cent. in 1935.

103. *Dysentery*.—102 cases of dysentery were admitted to hospital during the year with 5 deaths, compared with 93 cases and 5 deaths during 1935. The morbidity rate was 0.9 per cent. compared with 0.8 per cent. in 1935.

104. *Ankylostomiasis*.—The mass treatment of labourers for this disease was carried out twice during the year on many of the estates and 4,172 labourers were treated.

XIX.—NATIVE HEALTH INVESTIGATION.

105. During the year 1936 an investigation into Native Health was carried out by Dr. J. O. Shircore, C.M.G., M.B., M.R.C.P.; the terms of reference were:—

- (1) Generally to study the sociological and economic conditions under which the people live, and all matters relating to the health, morbidity, and mortality of the population, with special reference to mother and child.
- (2) To submit a report, making at the same time recommendations calculated to promote the well being of the Native and counteract the influence of any dysgenic at play.

XX.—REVENUE.

106. The total revenue of the Medical Department for the year 1936 amounted to \$13,988.90 compared with \$15,867.16 in 1935, a decrease of \$1,878.26.

EXPENDITURE.

107. The total expenditure of the Medical Department for the year 1936 amounted to \$161,486.77 compared with \$161,067.87 in 1935, an increase of \$418.90.

XXI.—HOSPITAL DRESSERS.

108. Two examinations for Hospital Dressers for promotion in Grade were held during the year in Sandakan and Jesselton on 2nd and 3rd June, and 1st and 2nd December.

109. Five Dressers employed by Government and one Dresser in private employ entered for the examination in June; of these, two qualified for promotion to Grade II, and one to Grade III.

110. Four Dressers employed by Government and one Dresser in private employ entered for the examination in December; of these, one qualified for promotion to Grade III.

XXII.—STAFF.

111. Dr. P. A. Dingle carried out the duties of Principal Medical Officer throughout the year.

112. Dr. J. K. O'Byrne carried out the duties of District Surgeon, Jesselton, throughout the year.

113. Dr. J. C. T. Tregarthen carried out the duties of District Surgeon, Beaufort and Interior until the 11th December, 1936, when he was transferred to Tenom on appointment as District Surgeon, Interior.

114. Dr. J. P. Taylor returned from leave on 27th November, and resumed duty as District Surgeon, Sandakan, from 30th November, 1936.

115. Dr. Gerald Stonehill, M.R.C.S. Eng., L.R.C.P. London, reported his arrival on 23rd January, 1936, and was appointed District Surgeon Sandakan with effect from 26th January, 1936. He was transferred to Kudat on 11th December, 1936, on appointment as District Surgeon, Kudat.

116. Dr. Hugh Wands, M.B., Ch.B., Glasgow, reported his arrival on 1st April, 1936, and was appointed District Surgeon, Kudat, with effect from 14th April, 1936. On 11th December, 1936. He was transferred to Beaufort on appointment as District Surgeon, Beaufort.

117. Miss E. Ashworth carried out the duties of Nurse-Matron, Civil Hospital, Sandakan, throughout the year.

118. Miss A. M. Davies carried out the duties of Nurse-Matron, Civil Hospital, Jesselton, throughout the year.

PERCIVAL A. DINGLE.
Principal Medical Officer.
North Borneo.

